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Compost-Amended Topsoil

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INTRODUCTION

When topsoils are being prepared for planting in landscape areas, they are often amended with an organic material to create optimum conditions for plant growth. Compost enhances soil texture, increases the ability of the soil to absorb air and water, suppresses weed growth, prevents erosion, and reduces the need for water, fertilizers, and pesticides.

Compost Types

In our region, municipal yard waste and biosolids are used to produce compost.

- Yard Waste compost is made with decaying organic matter, such as leaves and lawn clippings.
- Biosolids compost is made by blending sawdust with the nutrient-rich organic material obtained as a by-product of wastewater treatment.

USAGE HISTORY AND EXPERIENCE

Compost-amended topsoil is specified for use in maintenance and construction projects. The Roads Environmental Unit reported that in the past year, their contractors used almost 4,000 cubic yards of topsoil containing yard-waste compost.

Many construction contracts require the use of biosolids compost as well, since the county produces biosolids and contracts with a local recycler to produce biosolids compost and has a policy that requires it's use:

> **28.86.090 Biosolids policies (BP) (Ordinance #13680 from 1999)**
> A. Explanatory material. The biosolids policies are intended to guide the county to continue to produce and market class B biosolids. The county will also continue to evaluate alternative technologies so as to produce the highest quality marketable biosolids. This would include technologies that produce class A biosolids.
>
> B. Policies.
>
> - BP-1: King County shall strive to achieve beneficial use of wastewater solids. A beneficial use can be any use that proves to be environmentally safe, economically sound and utilizes the advantageous qualities of the material.

- BP-2: Biosolids-derived products should be used as a soil amendment in landscaping projects funded by King County.

BID AND CONTRACT LANGUAGE

King County agencies purchase compost and compost-amended topsoil through term-contracts with local vendors and through subcontractors through large construction contracts. This section includes specifications (shaded areas) from King County and Washington State.

Washington State Department of Transportation

9-14 Erosion Control and Roadside Planting[1]

9-14.1 Topsoil

Topsoil shall not contain any recycled material, foreign materials, or any listed Noxious and Nuisance weeds of any Class designated by authorized State or County officials. Aggregate shall not comprise more than 10 percent by volume of Topsoil and shall not be greater than two inches in diameter.

9-14.1(1) Topsoil Type A

Topsoil Type A shall be as specified in the Special Provisions.

9-14.1(2) Topsoil Type B

Topsoil Type B shall be native topsoil taken from within the project limits either from the area where roadway excavation is to be performed or from strippings from borrow, pit, or quarry sites, or from other designated sources. The general limits of the material to be utilized for topsoil will be indicated in the Plans or in the Special Provisions. The Engineer will make the final determination of the areas where the most suitable material exists within these general limits. The Contractor shall reserve this material for the specified use. Material for Topsoil Type B shall not be taken from a depth greater than 1 foot from the existing ground unless otherwise designated by the Engineer.

In the production of Topsoil Type B, all vegetative matter, less than 4 feet in height, shall become a part of the topsoil. Prior to topsoil removal, the Contractor shall reduce the native vegetation to a height not exceeding 1 foot

9-14.1(3) Topsoil Type C

Topsoil Type C shall be native topsoil meeting the requirements of Topsoil Type B but obtained from a source provided by the Contractor outside of the Contracting Agency owned right of way.

9-14.4(8) Compost

Compost products shall be the result of the biological degradation and transformation of organic materials under controlled conditions designed to promote aerobic decomposition. Compost shall be stable with regard to oxygen consumption and carbon dioxide generation. Compost shall be mature with regard to its suitability for serving as a soil amendment or an erosion control BMP as defined below. The compost shall have a moisture content that has no visible free water or dust produced when handling the material.

Compost production and quality shall comply with WAC 173-350.

Compost products shall meet the following physical criteria:

[1] **Ref: Pg. 818-823**

Fine compost shall meet the following gradation:

Sieve Size	Percent Passing	
	Minimum	Maximum
1"	100	
⅝"	90	100
¼"	75	100

Note: Maximum particle length of 4 inches.

Medium compost shall meet the following gradation:

Sieve Size	Percent Passing	
	Minimum	Maximum
1"	100	
⅝"	85	100
¼"	70	85

Note: Maximum particle length of 4 inches. Medium compost shall have a carbon to nitrogen ratio (C:N) between 18:1 and 35:1. The carbon to nitrogen ratio shall be calculated using the dry weight of "Organic Carbon" using TMECC 04.01A divided by the dry weight of "Total N" using TMECC 04.02D.

Coarse compost shall meet the following gradation:

Sieve Size	Percent Passing	
	Minimum	Maximum
2"	100	
1"	90	100
¾"	70	100
¼"	40	60

Note: Maximum particle length of 6 inches. Coarse compost shall have a carbon to nitrogen ratio (C:N) between 25:1 and 35:1. The carbon to nitrogen ratio shall be calculated using the dry weight of "Organic Carbon" using TMECC 04.01A divided by the dry weight of "Total N" using TMECC 04.02D.

1. Compost material shall be tested in accordance with U.S. Composting Council Testing Methods for the Examination of Compost and Composting (TMECC) 02.02-B, “Sample Sieving for Aggregate Size Classification”.
2. The pH shall be between 6.0 and 8.5 when tested in accordance with U.S. Composting Council TMECC 04.11-A, “1:5 Slurry pH”.
3. Physical contaminants, defined in WAC 173-350 (plastic, concrete, ceramics, metal, etc.) shall be less than 0.5 percent by weight as determined by U.S. Composting Council TMECC 03.08-A “Classification of Inerts by Sieve Size”.
4. Minimum organic matter shall be 40 percent by dry weight basis as determined by U.S. Composting Council TMECC 05.07A “Loss-On-Ignition Organic Matter Method (LOI)”.
5. Soluble salt contents shall be less than 4.0 mmhos/cm when tested in accordance with U.S. Composting Council TMECC 04.10 “Electrical Conductivity”.
6. Maturity shall be greater than 80 percent in accordance with U.S. Composting Council TMECC 05.05-A, “Germination and Root Elongation”.
7. Stability shall be 7-mg CO2–C/g OM/day or below in accordance with U.S. Composting Council TMECC 05.08-B “Carbon Dioxide Evolution Rate”.
8. The compost product shall originate from recycled plant waste as defined in WAC 173-350 as “Wood waste”, “Yard debris”, “Post-consumer food waste”, “Preconsumer animal-based wastes”,

and/or “Preconsumer vegetative waste”. The Contractor shall provide a list of feedstock sources by percentage in the final compost product.

9. The Engineer may also evaluate compost for maturity using U.S. Composting Council TMECC 05.08-E “Solvita® Maturity Index”. Fine compost shall score a number 6 or above on the Solvita® Compost Maturity Test. Medium and coarse compost shall score a 5 or above on the Solvita® Compost Maturity Test.

9-14.4(8)A Compost Submittal Requirements

The Contractor shall submit the following information to the Engineer for approval:

1. The Qualified Products List printed page or a Request for Approval of Material (WSDOT Form 350-071).
2. A copy of the Solid Waste Handling Permit issued to the manufacturer by the Jurisdictional Health Department in accordance with WAC 173-350 (Minimum Functional Standards for Solid Waste Handling).
3. The Contractor shall verify in writing and provide lab analyses that the material complies with the processes, testing, and standards specified in WAC 173-350 and these Specifications. An independent Seal of Testing Assurance (STA) Program certified laboratory shall perform the analyses.
4. A copy of the manufacturer’s Seal of Testing Assurance STA certification as issued by the U.S. Composting Council.

9-14.4(8)B Compost Acceptance

Fourteen days prior to application, the Contractor shall submit a sample of the compost approved for use, an STA test report dated within 90 calendar days of the application, and the list of feed stocks by volume for each compost type to the Engineer for review.

The Contractor shall use only compost that has been tested within 90 calendar days of application and meets the requirements in Section 9-14.4(8). Compost not conforming to the above requirements or taken from a source other than those tested and accepted shall not be used.

King County Contracts

Solid Waste Division and Wastewater Treatment Projects:

Work Order Landscape Site Maintenance for Solid Waste Division, Contract No. C00968C15 and Project: Mitigation / Landscape Site Maintenance Work Order 2014 Contract C00866C14 had the same specifications:

PART 2 PRODUCTS

- 2.1 MATERIALS E. Compost
  - “A maximum of 35 percent by volume of other approved organic waste and/or biosolids may be substituted for recycled plant waste.”
- 2.2 ORGANIC AMENDMENT
  - A. Compost for turf and groundcover: 1. 100 percent Groco, manufactured by Groco and distributed by Sawdust Supply, 15 S. Spokane Street, Seattle Washington, (206) 622-5141.
  - B. Compost for pocket plantings 1. 100 percent Groco

Roads Project:

SE Covington Sawyer Road / 181st Ave SE at SE Covington Sawyer Road

- 8-02.3(6)A COMPOST (NEW SECTION) Fine Compost meeting the requirements of Section 9-14.4(8) shall be used as the uniform planting medium throughout all disturbed areas, including swales, ditches, cut and fill slopes, staging and other areas disturbed by construction. Three (3) inches of compost shall be placed initially as a "cover measure BMP over all disturbed areas as directed by the Engineer. Prior to seeding, the compost shall be incorporated to a minimum depth of nine (9) inches in all disturbed areas (including staging areas within the project limits). After the compost has been spread, all large clods, hard lumps, wood, debris and rocks two (2) inches in diameter and larger, and litter shall be raked up, removed, and disposed of by the Contractor. Compost shall not be placed when the ground or topsoil is frozen, excessively wet, or in the opinion of the Engineer, in a condition detrimental to the Work.

- 9-14.4(8) Compost The second paragraph is revised to read: Compost production and quality shall comply with WAC 173-350. 9-14.4(8)A Compost Submittal Requirements Item 2 is revised to read: 2. A copy of the Solid Waste Handling Permit issued to the manufacturer by the Jurisdictional Health Department in accordance with WAC 173-350 (Minimum Functional Standards for Solid Waste Handling).

Roads Maintenance

Roads Operations uses compost for maintenance projects. Here are the specifications (shaded areas) they use.

Compost

Standard Specifications: 9-14.4(8)

1. Compost shall contain no plastic, concrete, glass, tree or shrub branches, fresh or partially decomposed wood by-products or similar material. Compost containing yard waste or biosolids shall be produced at a facility possessing a valid Solid Waste Composting Permit issued by the jurisdictional Health Department.
2. Bidder shall indicate the source of feedstocks for the compost, such as: yard waste, yard waste and dairy cow manure with bedding, biosolids and yard wastes, etc.

Compost Topsoil

Specifications:

1. Compost Amended Topsoil shall be a commercially manufactured mixture of soil and pure compost which meets the physical and chemical requirements for Type B topsoil in accordance with Standard Specifications 9.14.1(2) except that the total organic matter content shall be 15% to 30%. The compost used in the mixture shall consist of a well-decomposed, humus-like material derived from composting of yard waste, biosolids, or well rotted manure with a minimum of litter (straw, sawdust, or shavings). The organic material shall contain no plastic, concrete, glass, tree or shrub branches, fresh or partially decomposed wood by-products or similar material. Compost containing yard waste or biosolids shall be produced at a facility possessing a valid Solid Waste Composting Permit issued by the jurisdictional Health Department.

Roads Engineering Environmental Unit

Landscaping is a part of many roads projects, and compost is typically used. Here is the compost specification (shaded areas) generally used in their project documents:

Compost

Compost products shall contain composted plant material derived from the aerobic decomposition of recycled plant waste. The composted plant waste shall have a moisture content that has no visible free water or dust produced when handling the material.

Compost shall be stable, mature, decomposed organic solid waste that is the result of the accelerated, aerobic biodegradation and stabilization under controlled conditions. The result is a uniform dark, soil-like appearance.

Compost maturity or stability is the point at which the aerobic biodegradation of the compost has slowed and oxygen consumption and carbon dioxide generation has dropped. Subsequent testing provides consistent results.

Compost production and quality shall comply with the Interim Guidelines for Compost Quality, #94-38 or superseding editions, and amendments, published by the Washington State Department of Ecology.

Compost products shall meet the following physical criteria:

1. Compost material shall be tested in accordance with AASHTO Test Method T87 and T88. 100% of Type 1 Compost shall pass through a 5/8" sieve. 90% of Type 2 Compost shall be larger than 3/8 inch and smaller than 1 inch.
2. The pH range shall be between 5.5 and 8.5 when tested in accordance with WSDOT Test Method 417.
3. Manufactured inert material (plastic, concrete, ceramics, metal, etc.) shall be less than 1 percent on a dry weight or volume basis, whichever provides for the least amount of foreign material.
4. Minimum organic matter shall be 30 percent dry weight basis as determined by loss on ignition. (LOI test)
5. Soluble salt contents shall be less than 4.0 mmhos/cm for areas that receive less than 20 inches of precipitation per year and 6.0 mmhos/cm for areas that receive more than 20 inches of precipitation per year.
6. Type 1 Compost shall score a number 6 or above on the Solvita Compost Maturity Test. Type 2 Compost shall score a 5 or above on the Solvita Compost Maturity Test.

All compost products will be tested within 30 calendar days prior to application by the Contracting Agency with samples taken from the material stockpiled by the supplier for project use. Compost not conforming to the above requirements or taken from a source other than those tested shall be immediately removed from the project and replaced at no cost to the Contracting Agency.

Acceptance of composted products shall be based on the following submittals by the Contractor:

1. A Request for Approval of Material Source.
2. A copy of the Solid Waste Handling Permit issued to the supplier by the Jurisdictional Health Department as per WAC 173-304 (Minimum Functional Standards for Solid Waste Handling).
3. Written verification from the supplier that the material complies with the processes, testing, and standards specified in the Interim Guidelines for Compost Quality.
4. Written verification from the supplier that the compost products originate a minimum of 65 percent by volume from recycled plant waste. A maximum of 35 percent by volume of other approved organic waste and/or biosolids may be substituted for recycled plant waste.
5. A copy of the lab analyses described under Testing Parameters in the Guidelines for Compost Quality. The analyses shall be less than three months old.
6. A list of the feedstock by percentage present in the final compost product.

FOR MORE INFORMATION

US Composting Council

Environmental Protection Agency (EPA) - 40 CFR Part 503 Biosolids Rule Class A and B

Washington State Department of Ecology Compost

Compost Facility Standards – WAC 173-350-220 (replaces Interim Guidelines for Compost Quality)

Washington Organic Recycling Council (WORC)

Washington State University Soil Management

Natural Yard Care – City of Seattle/King County

VENDOR INFORMATION

Cedar Grove Compost (yard waste) CPA#5492288
Maple Valley, WA
1-877-SOILS-4U (toll free)

Sawdust Supply - Groco (biosolids)
Seattle, WA
206-622-4321 OR 1-888-622-4321